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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/830,949	07/06/2001	Naohiro Hirose	250602US40PCT	5351
22850	7590	05/22/2008		
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER CHAMBLISS, ALONZO	
			ART UNIT	PAPER NUMBER
			2892	
			NOTIFICATION DATE	DELIVERY MODE
			05/22/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 09/830,949	Applicant(s) HIROSE, NAOHIRO	
	Examiner Alonzo Chambliss	Art Unit 2892	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 May 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 90-121 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 90-121 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/15/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 2/29/08 have been fully considered but they are not persuasive. In regards to Seyama and Ainslie failing to disclose forming at least one metal layer only within the exposed portion, i.e. not entirely over the upper surface of the pad structure. The claims are not so limited in scope to recite only within the exposed portion. Therefore, Seyama and Ainslie discloses the claimed invention.

This action is made **final**.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 90-96, 100-110, 113-115, and 117-121 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seyama et al. (US 5,586,006) in view of Ainslie et al. (US 4,418,857).

With respect to Claims 1, 103, 116, and 117-121, Seyama discloses an outermost interlayer resin insulating layer 32B-4 (i.e. epoxy resin). A pad structure 32A-5 formed on the outermost interlayer resin insulating layer 32B-4. A solder resist 32B-5 (i.e. protective insulating layer) formed on the outermost interlayer resin insulating layer 32B-4 and the pad structure 32A-5, wherein the solder resist 32B-5 has an opening

exposing a partially exposed portion of the pad structure 32A-5. A conductive connecting pin 34 configured to establish an electrical connection with another substrate 18. The conductive connecting pin 34 being secured to the partially exposed portion of the pad structure 32A-5 via a solder 38. A via hole formed through the outermost interlayer resin insulating layer 32B-4 and configured to electrically connect the pad structure 32A-5 to at least one conductive circuit 32A-4 formed below the outermost interlayer resin insulating layer 32B-4, the via hole being positioned directly below the pad structure 32A-5 (see col. 4 lines 1-67 and col. 5 lines 1-15; Figs. 4 and 5). Seyama fails to disclose a plurality of metal layer formed in the partially exposed portion of the pad structure. Ainslie discloses a plurality of metal layer 21,22 (i.e. made of Ni which is capable of preventing corrosion) formed in the partially exposed portion of the pad structure 11 (see col. 4 lines 5-50). Thus, Seyama and Ainslie have substantially the same environment of a pin electrically connected to a pad on substrate by a solder material. Therefore, one skilled in the art at the time of the invention would readily recognized incorporating at least one metal layer between the pin and pad structure of Seyama, since the at least one metal layer would improve the electrical connection while creating a strong bond between the pin and the pad structure as taught by Ainslie.

With respect to Claims 90 and 104, Seyama discloses at least one conductor layer comprising a plurality of conductor circuits 32A-3, 32A-2, and 32A-1 formed below the outermost interlayer resin insulating layer. At least one interlayer resin insulating layer formed below the conductor layer wherein the conductor layer and the interlayer resin insulating layer are alternately formed (see Fig. 5).

With respect to Claims 91-93 and 105-107, Seyama discloses wherein the pad structure comprises an outermost conductor portion (i.e. the pad has a outermost conductor portion that is exposed and an innermost conductor portion inner of the pad) formed on the outermost interlayer resin insulating layer and the at least one conductor circuit is positioned directly below the pad structure (see Figs. 4 and 5).

With respect to Claims 94 and 108, Seyama discloses at least one lower via hole directly connected to the via hole and formed through the at least one interlayer resin insulating layer formed below the conductor layer, the at least one lower via hole being configured to electrically connect the via hole to at least one of the conductor circuits in the at least one conductor layer (see Fig. 5).

With respect to Claims 95 and 109, Seyama discloses wherein the pad structure comprises a plane layer (see Fig. 5).

With respect to Claims 96 and 110, Seyama discloses a signal line (i.e. located attached to bump 40) formed on the outermost interlayer resin insulating layer, wherein the signal line electrically connects to the pad structure by circuit layer s 32A-2 and 32A-3. The signal line is partially covered with the solder resist (see Fig. 5).

With respect to Claims 97 and 111, Seyama discloses the claimed invention except for a diameter of the pad structure is 1.02 times to 100 times a diameter of the opening. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the diameter of the pad of Seyama between 1.02 times to 100 times the diameter of the opening, since it has been held that where

the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Allen, 105 USPQ 233.

With respect to Claims 98 and 112, Seyama discloses the claimed invention except for the pin made of Cu. However, Ainslie discloses a pin made of Cu (see col. 4 lines 20-25. Thus, Seyama and Ainslie have substantially the same environment of a pin connected to a metal layer of a substrate. Therefore, one skilled in the art at the time of the invention would readily recognize incorporating copper for the material of the pin of Seyama, since the copper would provide a reliable material for electrical connection between the substrate and external device as taught by Ainslie.

With respect to Claims 100-102 and 113-115, it is inherent feature that the pad structure has a roughened surface since the pad is made of metal, which would have some level of roughness.

4. Claim 99 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seyama et al. (US 5,586,006) and Ainslie et al. (US 4,418,857) as applied to claims 1 and 98 above, and further in view of Watanabe (JP 58-030175).

With respect to Claim 99, Seyama discloses the claimed invention except for a columnar connection portion has constriction portion having a diameter, which is smaller than the diameter of the other portions. However, Watanabe discloses wherein the columnar connection portion 6 has constriction portion 601 having a diameter, which is smaller than the diameter of the other portions (see English abstract and Fig. 2). Thus, Seyama- Ainslie and Watanabe have substantially the same environment of a pin attached to a substrate. Therefore, one skilled in the art at the time of the invention

would readily recognize incorporating a constriction portion on the pin of Seyama, since the constriction portion would connection between the substrate and an external device as taught by Watanabe.

The prior art made of record and not relied upon is cited primarily to show the product of the instant invention.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (571) 272-1927.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system Status information for published applications may be obtained from either Private PMR or Public PMR. Status information for unpublished applications is available through Private PMR only. For more information about the PMR system see <http://pair-dkect.uspto.gov>. Should you have questions on access to the Private PMR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or EBC_Support@uspto.gov.

AC/May 18, 2008

/Alonzo Chambliss/
Primary Examiner, Art Unit 2814